

GAUSSIAN ELIMINATION

$$[A|B] \rightarrow [I|X]$$

Solve:
$$\begin{cases} x+5y=2 \\ -3x+6y=15 \end{cases}$$

- 1) At first we have to "transform" the system of equations into a matrix, and we have:

$$\left[\begin{array}{cc|c} 1 & 5 & 2 \\ -3 & 6 & 15 \end{array} \right]$$

→ in the Gaussian method we have to do as many operations on rows until we get the diagonal matrix on the left side. On the right side we will

have the result, the value of x and y .

2)

$$\xrightarrow{r_2: r_2 + 3 \cdot r_1} \left[\begin{array}{cc|c} 1 & 5 & 2 \\ 0 & 21 & 21 \end{array} \right]$$

In this step we had to multiply the first row by 3 and add to the row number 2.

3)

$$\xrightarrow{r_2: r_2 : 21} \left[\begin{array}{cc|c} 1 & 5 & 2 \\ 0 & 1 & 1 \end{array} \right]$$

In this step we divided the second row by 21 and we obtain 1 in the second row of diagonal matrix.

4)

$$\xrightarrow{r_1: r_1 - 5r_2} \left[\begin{array}{cc|c} 1 & 0 & -3 \\ 0 & 1 & 1 \end{array} \right]$$

diagonal matrix

In the last step we multiplied the second row by 5 and we had to subtract the result from the first row.